

Induction of cardiogenesis in pluripotent cells via chromatin remodeling factors

Grant Award Details

Induction of cardiogenesis in pluripotent cells via chromatin remodeling factors

Grant Type: New Faculty II

Grant Number: RN2-00903

Project Objective: Goal of the award is to drive cardiac lineage commitment with chromatin remodeling factors and to determine the mechanism by which this occurs.

Investigator:

Name:	Benoit Bruneau
Institution:	Gladstone Institutes, J. David
Type:	PI

Disease Focus: Heart Disease

Human Stem Cell Use: Embryonic Stem Cell, iPS Cell

Award Value: \$2,723,653

Status: Closed

Progress Reports

Reporting Period: Year 1

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Reporting Period: Year 3

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Reporting Period: Year 4

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Reporting Period: Year 5

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Grant Application Details

Application Title: Induction of cardiogenesis in pluripotent cells via chromatin remodeling factors

Public Abstract: Heart disease is one of the biggest killers in the civilized world, and as populations age, this trend will increase dramatically. Currently the only way to treat failing hearts is with expensive and relatively ineffective drugs, or by heart transplantation. Ideally, we would like to be able to regenerate sick or dead heart tissue. The best strategy would be to make new heart cells that match the patients' cells (to avoid rejection), and inject them into diseased heart so that they could regenerate the sick heart. Unfortunately, current strategies that are planned to do so are ineffectual. We wish to attempt to generate heart cells from human embryonic stem cells, or skin-derived "induced pluripotent cells" by "reprogramming" the stem cells into heart cells. This would be accomplished by turning on heart genes that normally are off in stem cells and seeing if this turns stem cells into heart cells. If this approach is successful, these newly generated stem cells could be used for regenerative therapies in the future.

Statement of Benefit to California: Heart disease is the leading killer of adults in the Western world. Hundreds of thousands of people in the US die of heart failure or sudden cardiac death each year. Largely, this is because inadequate therapies exist for the repair or treatment of the diseased heart. Our goal is to develop a means to efficiently convert pluripotent stem cells, including induced pluripotent cells (iPS cells) into new heart cells that could be used therapeutically to help regenerate healthy heart tissue. The results of our studies will help develop new technology that is likely to contribute to the California biotechnology industry. Our studies will develop technologies that can be used by biotechnology companies and researchers who wish to develop regenerative medicine therapies in a clinical setting. We are working closely with California companies to develop new microscopes, assay devices, and analytical software that could be the basis for new product lines or new businesses. If therapies do come to fruition, we anticipate that California medical centers will be leading the way. The most important contribution of this study will be to improve the health of Californians. Heart disease is a major cause of mortality and morbidity, resulting in billions of dollars in health care costs and lost days at work. Our goal is to contribute research that would ultimately improve the quality of life and increase productivity for millions of people who suffer from heart disease.

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